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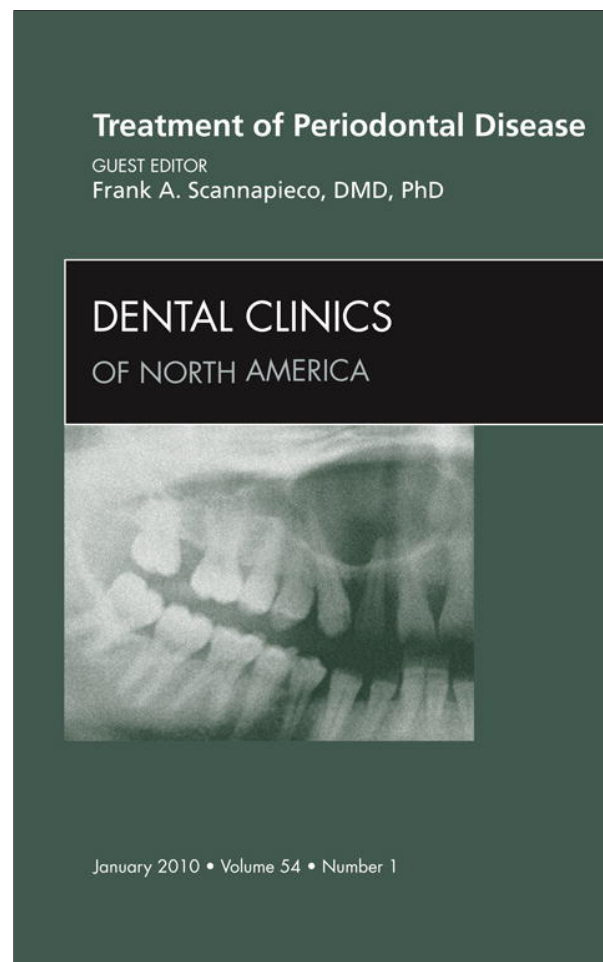
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Dental Implants in the Periodontal Patient

Gary Greenstein, DDS, MS^{a,b,*}, John Cavallaro Jr, DDS^{a,b},
Dennis Tarnow, DDS^{a,b}

KEYWORDS

• Dental implants • Periodontitis • Risk factors

The principal reason for providing periodontal therapy is to achieve periodontal health and retain the dentition. This objective includes restitution of form and function, esthetics, and avoidance of further periodontal disease progression.¹ Although not mandatory to sustain life, many people prefer to have a full or functioning dentition. Replacement of lost teeth with conventional prostheses on natural teeth or with dental implants is desirable. In this regard, osseointegration of dental implants is a predictable treatment modality and an integral aspect of treatment planning in the periodontal patient who has or is expected to lose teeth.^{2,3} Patients with a history of periodontitis, however, represent a unique group of individuals who previously succumbed to a bacterial challenge. Therefore, it was deemed important to address the management and survival rate of implants in these patients. Systematic reviews often are cited in this article, because they provide a high level of evidence and facilitate reviewing a vast amount of information in a succinct manner.

MAJOR CAUSES OF TOOTH LOSS IN PATIENTS

It has been questioned whether dental caries or periodontal diseases are the main cause of tooth loss. Several investigations have indicated the main reason for tooth extraction in all age groups is caries^{4,5}; however, others suggest it is periodontal diseases.^{2,6-8} An apparent interpretation of their findings is that caries causes tooth loss in more patients, but periodontal diseases are responsible for more teeth being removed in individual patients.^{8,9} In addition, periodontitis is the principal reason for edentulism in individuals vulnerable to periodontal diseases.⁹⁻¹¹ Because more teeth are lost due to periodontal disease than any other oral affliction, the issue as to the

^a Department of Periodontology & Implant Dentistry, New York University College of Dentistry, 900 West Main Street, Freehold, NJ 07728, USA

^b Private Practice

* Corresponding author. Department of Periodontology & Implant Dentistry, New York University College of Dentistry, 900 West Main Street, Freehold, NJ 07728, USA.

E-mail address: ggperio@aol.com (G. Greenstein).

success of placing dental implants in patients with a history of periodontitis is an important treatment planning consideration.

ETIOLOGIC AGENTS OF PERIODONTITIS AND PERI-IMPLANTITIS

Bacteria are the main etiologic agents that induce periodontitis and peri-implantitis¹²; therefore, knowledge concerning the main pathogens is important for understanding the linkage between retention of implants and a patient's history of periodontitis. Within the human oral cavity, hundreds of species of bacteria have been identified.¹³ In individuals with chronic periodontitis, it has been reported that the predominant bacterial species are gram-negative anaerobes; however, other microorganisms may be present. The main pathogens identified were *Porphyromonas gingivalis*, *Prevotella intermedia*, *Actinobacillus actinomycetemcomitans* (*Aggregatibacter actinomycetemcomitans*), *Bacteroides forsythus* (*Tannerella forsythensis*), and *Treponema*.¹³ Numerous studies have indicated the composition of the microflora associated with periodontitis and peri-implantitis (bleeding and bone loss around an implant) are similar.^{14–18} Furthermore, when Shibli and colleagues¹⁹ compared the microflora around implants that manifested peri-implantitis and those that were healthy, it was noted that the same types of bacteria were present around diseased and healthy implants; but an increased quantity of bacteria was found at diseased sites.

With respect to the rate that bacteria from a tooth colonize an implant, Quirynen and colleagues²⁰ reported that initial subgingival colonization of implants with bacteria associated with periodontitis can occur within 2 weeks in partially edentate patients. On the other hand, in completely edentate individuals, Danser and colleagues²¹ noted that the main reservoir of colonization for dental implants in edentulous patients was oral mucous membranes. After all teeth were removed due to periodontitis, they found that bacteria harbored by individuals with dental implants were species usually associated with a healthy periodontium or gingivitis. It was suggested that extraction of natural teeth resulted in elimination of two potential pathogens, *A actinomycetemcomitans* and *P gingivalis*. In contrast to these findings, however, others^{22,23} indicated that implants placed into edentate individuals experienced re-emergence of bacterial pathogens by 6 months with an almost identical spectrum of pathogens, including *P gingivalis*, *T forsythensis*, and other pathogenic bacteria that were present before the teeth were extracted.

In summary, the finding that bacteria associated with implant health and disease are similar is not surprising, because most microbes located in the oral cavity are considered indigenous organisms.^{24,25} Furthermore, it appears that teeth and other reservoirs of bacteria (mucous membranes, saliva, pharynx) in edentate patients have the potential to be a source of bacterial reinfection once implants are placed. This underscores the need to initiate periodontal therapy in patients with periodontitis before placing dental implants to reduce the level of potential pathogens, thereby inhibiting them from colonizing the implants and initiating peri-implantitis.

SURVIVAL OF IMPLANTS IN PATIENTS WITH A HISTORY OF PERIODONTITIS

Individuals who were fully or partially edentate were successfully rehabilitated using osseointegrated dental implants to support fixed prostheses.^{26–29} The question remains as to whether these individuals are at greater risk of developing peri-implantitis than patients who have not previously had periodontal diseases, and if they are, how great are the risks and what can be done to enhance successful therapy with implants.

Partially Edentulous Patients

Karoussis and colleagues²⁶ conducted a systematic review of the literature with respect to the success/survival rates of dental implants placed in patients with a history of periodontitis who were partially dentate. Studies were assessed in two categories: short term (< 5 years) and long term (> 5 years) after osseointegrated implants were placed in periodontally compromised partially edentulous patients. Based upon 15 prospective investigations (seven short- and 8 long-term studies), the authors made the following observations. They found no statistically significant differences in the survival rates between the short- and long-term studies. However, when patients with a history of periodontitis were compared with individuals who were periodontally healthy, it was reported that patients with a history of periodontitis manifested significantly greater probing depths, more peri-implant marginal bone loss, and a higher incidence of peri-implantitis. It was concluded that implant survival rate was acceptable in individuals with a history of periodontitis who were in a maintenance program.

Fully Edentulous Patients

Several studies addressed the 15- to 20-year survival rates of implants placed in patients who were fully edentulous: For example, Astrand and colleagues²⁷ found a 99.2% survival rate for implants; Adell and colleagues²⁸ reported implant retention in the maxilla and mandible was 78% and 86%, respectively, and Jemt and Johansson²⁹ reported that the implant survival rate was 90.9%. It can be surmised that the long-term survival rates with implants seem satisfactory in edentate patients. It should be recognized, however, that these clinical trials did not specify that the involved patients had a history of periodontitis, which may affect the long-term survival rate.

Patients with a History of Aggressive Periodontitis

To clarify the success rate of implants in patients with a history of aggressive periodontitis (ie, juvenile and rapidly progressive periodontitis), Al-Zahrani³⁰ conducted a systematic review, which included nine articles, four of which were case reports. These publications demonstrated there was good short-term survival of implants placed in patients treated for aggressive periodontitis that subsequently were periodontally maintained. The data indicated, however, that bone loss occurred around implants in patients with a history of aggressive periodontitis more often than around implants in patients with history of chronic periodontitis or periodontally healthy individuals. In addition, the author made several comments that should be underscored to interpret these findings:

Periodontal diseases should be controlled before placement of implants.

Individuals with aggressive periodontitis may be susceptible to additional periods of disease progression. At present, however, no recommendations can be made to define a time period that should elapse before initiating implant therapy. There are a limited number of studies addressing the survival rate in patients with aggressive periodontitis.

It is unknown what effect retention of questionable teeth in these patients will have on the success rate of implants in individuals who had aggressive periodontitis.

Implant Placement in Sites Augmented with Guided Bone Regeneration

Because patients with a history of periodontitis often require guided bone regeneration (GBR) procedures (bone graft with a barrier) to restore bone before implant placement, it was considered important to address survival of implants in grafted bone.

A recent systematic review (11 studies included) by Hammerle and colleagues³¹ compared survival of implants in regenerated bone attained with GBR with survival of implants placed into native bone. The cumulative survival rates for implants in regenerated bone varied from 79.4% to 100% after 5 years of function. The authors concluded that there were no significant differences found in the controlled clinical trials with respect to survival rates between implants placed in regenerated bone compared with implants inserted in native bone. It should be recognized, however, that this review did not specifically look at patients with a history of periodontitis, which may affect the implant survival rate.

Implants in Sinus Augmented Bone

Several investigations specifically assessed the survival rate of implants placed into sinus grafts in patients who were periodontally compromised.^{32,33} Ellegaard and colleagues monitored 24 patients for 36 to 42 months³² and 68 patients for 10 years.³³ Both studies concurred that implants may be inserted into a sinus augmented with bone in periodontally compromised patients with the same success as implants placed in individuals without a history of periodontitis.

DIAGNOSTIC PARAMETERS TO ASSESS DENTAL IMPLANTS

The tissues that surround teeth and implants respond in a similar manner to a bacterial challenge. Peri-implant diseases consist of two entities: peri-implant mucositis that is similar to gingivitis, and peri-implantitis, which is comparable to periodontitis.³⁴ Mucositis denotes that there is inflammation of the tissue around an implant without any signs of bone loss. In contrast, peri-implantitis connotes mucosal inflammation and bone loss. There are a few parameters that can be used to diagnose peri-implant diseases.

Probing Depth

Deeper than usual probing depths around an implant may not indicate the presence of peri-implantitis, because an implant placed at various depths subgingivally can result in a deep sulcus.³⁵ Contributing to this finding is the fact that connective tissue fibers adhere to, but are not attached to an implant as they are to teeth; therefore, they do not impede probe tip penetration. Nevertheless, increasing probing depth over time is associated with loss of bone around an implant.³⁶ In health, the probe will penetrate to the apical extent of the epithelium, and the junctional epithelium heals within 5 days.³⁷ In peri-implantitis lesions, the probe will penetrate into the connective tissue. Stable probing depths in the absence of recession reflect stability of the tissues adjacent to the implant. In summary, it is prudent to probe around dental implants to assess periodontal peri-implant health during periodic examinations.³⁸

Bleeding Upon Probing

Healthy implant sites manifest an absence of bleeding, whereas sites with mucositis or peri-implantitis demonstrate bleeding upon probing 67% and 91% of the time, respectively.³⁹ Most importantly, it has been reported that an absence of bleeding is an indicator for a stable peri-implant condition with respect to future attachment loss.⁴⁰

Radiographs

Radiographs are a valuable aid in diagnosing loss of osseous support around an implant. Assessment of bone loss from the osseous crest to a fixed reference point

(eg, osseous crest to implant–abutment connection) can be recorded; however, limitations of radiographs should be noted. For example, panoramic films have distortion of about 23%.⁴¹ Furthermore, in general, radiographs underestimate bone loss, because a substantial amount of the buccal or lingual plate of bone needs to be demineralized before it is seen radiographically. Additionally, there is an inability to differentiate between defects in the buccal or lingual plate of bone.⁴² In contrast, computed tomography (CT) and cone beam volume imaging have provided accurate three-dimensional imaging of bone surrounding dental implants.^{43,44}

Biochemical and Other Markers of Disease

There are no biochemical markers from the peri-implant crevicular fluid or microbiological tests that are good predictors for future disease progression around dental implants.³⁸ Mobility is not a useful clinical parameter to monitor implants, because its presence denotes a failed implant that needs to be removed.³⁸ On the other hand, suppuration reflects an infection, but its presence may or may not denote the presence of ongoing bone loss.⁴⁵

RISK INDICATORS FOR PERI-IMPLANTITIS

Several risk indicators for peri-implantitis identified in cross-sectional and retrospective studies were investigated. These indicators, however, are not necessarily true risk factors (delineate a cause and effect relationship), which can be identified only by prospective clinical trials.

History of Periodontitis

Heitz-Mayfield³⁸ assessed four systematic reviews that addressed the history of periodontitis as a risk factor for peri-implantitis. Despite variations in clinical trials with respect to their design and maintenance schedules, it was concluded that patients with a history of periodontitis are at greater risk for peri-implantitis than individuals who never have had periodontitis.

Diabetes

Only one investigation evaluated the relationship between peri-implantitis and diabetes. Ferreira and colleagues⁴⁶ concluded that poor metabolic control in subjects with diabetes was associated with peri-implantitis (odds ratio was 1:9).

Genetics

Cytokine gene polymorphisms may alter the host response to a bacterial challenge and affect susceptibility to peri-implantitis. A recent systematic review by Huynh-Ba and colleagues⁴⁷ found that there is not enough evidence to support an association between the interleukin (IL)-1 genotype status and peri-implantitis. Therefore, at present, genetic testing for the evaluation of the risk of peri-implantitis cannot be suggested as a standard of care.

Smoking

A systematic review (included six studies) by Strietzel and colleagues⁴⁸ noted that there was a significant increase in marginal bone loss around implants in smokers compared with nonsmokers. It was concluded that smokers are at increased risk of biologic complications (eg, peri-implantitis and reduced implant survival rate) compared with nonsmokers.

Oral Hygiene

Two investigations indicated that poor oral hygiene was a risk indicator for peri-implantitis. Ferreira and colleagues⁴⁶ noted that individuals with very poor oral hygiene had an increased odds ratio (14:3) of experiencing peri-implantitis compared with patients with good oral hygiene. Similarly, Linquist⁴⁹ reported that after 10 years, smokers with poor oral hygiene (plaque accumulation was monitored) had three times greater marginal bone loss than nonsmokers.

Absence of Keratinized Tissue

The role of keratinized gingiva in maintaining dental implants is a controversial issue. Based on long-term implant success and survival studies, there appears to be little or no difference in the survival rate for implants surrounded by oral mucosa or keratinized tissue.⁵⁰

One paper, however, indicated that hydroxy apatite (HA)-coated implants had a higher survival rate when keratinized tissue was present.⁵¹ With respect to tissue inflammation, recession, and bone loss, there is conflicting information in the literature. When there was a dearth of keratinized gingiva, several investigators reported there was a statistically significant increased amount of inflammation,⁵² whereas others indicated the amount of inflammation was not increased when there was a lack of keratinized gingiva.^{45,53,54} Some researchers found that the absence of keratinized gingiva was associated with a statistically significant increased amount of recession (**Fig. 1**),^{53,55} but this finding conflicted with the data of others.^{56,57} Similarly, several studies concluded that the absence of keratinized gingiva was^{51,53} or was not^{45,58} associated with a statistically significant additional bone loss. A possible explanation for these contradictions is that with good oral hygiene, peri-implant soft tissue health can be maintained irrespective of the amount of keratinized gingival tissue surrounding implant/restoration present; however, if there is less than good oral hygiene, it may be advantageous to have keratinized gingiva.⁵⁰ In conclusion, despite a lack of data, some authors suggest that there may be situations when soft tissue augmentation at implant sites may need to be considered (eg, depending upon the site, dental history of the patient).⁵⁶ These recommendations to date, however, have no scientific basis.

Implant Surfaces

It should be noted that there are three types of surface roughness (Sa) on implants (minimally rough, Sa = 0.5 μm also referred to as machined implants, smooth, turned), moderately rough, Sa equal to 1 to 2 μm (eg, Osseotite [3i Implant Innovations, FL, USA], SLA [Straumann Company, MA, USA], TiUnite [Nobel Biocare, CA, USA]) and

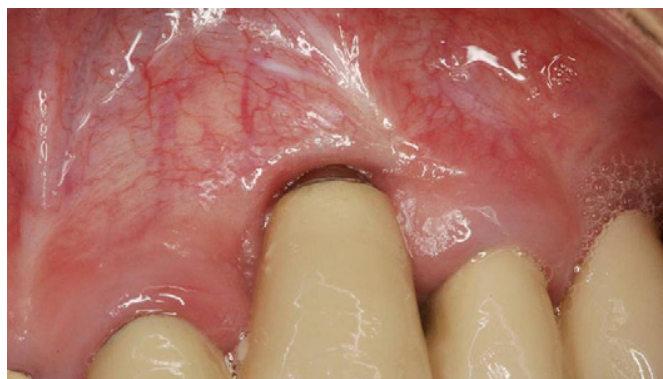


Fig. 1. At site #11, there is no attached keratinized gingiva. Despite the appearance of being healthy, there has been recession within the first year of the crown's placement.

rough, Sa greater than 2 μ m, (eg, plasma-sprayed and HA-coated implants)⁵⁹ and that with increasing roughness, implant surfaces attract and retain more bacteria.⁶⁰ There is limited and conflicting information, however, with respect to the impact of implant surface topography as a risk factor for peri-implantitis. In a dog model, investigators^{61,62} noted that the progression of peri-implantitis, if left untreated, is greater around implants with a moderately rough surface than those with a polished surface. In humans, Astrand and colleagues⁶³ also found that rough-surfaced implants had a higher incidence of peri-implantitis than smooth (turned) surfaces, whereas, Wennstrom and colleagues⁶⁴ reported similar bone level changes for turned and relatively rough surface implants. Albouy and colleagues⁶⁵ compared the amount of induced disease progression (dog model) with respect to four different surfaces (turned, Tio-Blast [Astra Tech Inc, MA, USA], sandblasted acid-etched, and TiUnite). They reported that disease progression was most pronounced at implants with a TiUnite surface. In summary, at present, there is insufficient information in people to make a definitive determination as to whether the surface characteristic of the implant predisposes a patient to peri-implantitis.

PREVENTION, PREVALENCE, AND THERAPY FOR PATIENTS WITH PERI-IMPLANTITIS

Prevention of Peri-implantitis: Periodontal Supportive Therapy

It is appropriate that clinicians maintain a recall system for patients who receive implants in order to monitor them and provide supportive periodontal therapy (SPT).⁶⁶ In this regard, Quirynen and colleagues⁶⁶ reviewed 16 studies and concluded that periodontally compromised patients can be maintained successfully with moderately rough implants if they are provided SPT. With respect to the time interval between SPT visits, numerous investigations indicated that a 3-month interval is adequate for most periodontal patients⁶⁷; but some patients need more or less frequent visits.

Prevalence of Peri-Implantitis

Zitzmann and Berglundh³⁵ conducted a literature review to determine the prevalence of peri-implant mucositis and peri-implantitis. For studies to be included in their assessment, patients needed to have been monitored more than 5 years and included more than 50 subjects. Only two investigations met these criteria. The data were reported with regard to the percentage of implants and percentage of patients who manifested peri-implant diseases. The investigators noted that after 5 years that peri-implant mucositis (bleeding upon probing) was found in approximately 80% of the subjects and around 50% of the implants. In the two groups included in the systematic review, peri-implantitis (bleeding and bone loss) was detected as follows: group 1-28% of the subjects and 12% of the sites; group 2-greater than 56% of subjects and at 43% of implant sites (Branemark implants [Nobel Biocare, CA, USA]). Accordingly, it can be concluded that over time the prevalence of peri-implant diseases is greater than previously expected.

Treatment for Peri-Implant Diseases

Nonsurgical therapy

Renvert and colleagues⁶⁸ selected 24 studies to assess nonsurgical therapy for mucositis and peri-implantitis. They reported that nonsurgical mechanical therapy could be used effectively to treat mucositis. Furthermore, antimicrobial mouth rinses improved the outcome of mechanical therapy. For peri-implantitis, however, nonsurgical therapy was not found to provide satisfactory outcomes, and adjunctive rinsing with chlorhexidine had limited value. Local or systemic drug delivery helped decrease

bleeding upon probing and probing depths^{12,69-71}; however, it could not resolve peri-implantitis. They also indicated that laser therapy has the potential to be efficacious, but there are not enough data at this time to judge its effectiveness as a nonsurgical treatment modality.

Surgical therapy

Claffey and colleagues⁷² evaluated information gathered from animal and human clinical trials concerning surgical therapy for peri-implantitis. Histologic data from animal studies validated that reosseointegration to contaminated surfaces was attainable, but not predictably.⁷² No single method of decontaminating the roots (eg, chemical agents, air abrasives and lasers) appeared to be distinctly better than other techniques. It was concluded that open debridement with surface decontamination can resolve peri-implantitis (**Fig. 2**). With respect to people, one study indicated that therapy was successful in 58% of the patients.⁷³ Nevertheless, at present there does not appear to be a best treatment of peri-implantitis. Furthermore, bone grafts with and without barriers have been used with varying degrees of success.

A consensus statement from the 6th European Workshop on Periodontology found that for mucositis, nonsurgical mechanical therapy resulted in a reduction in

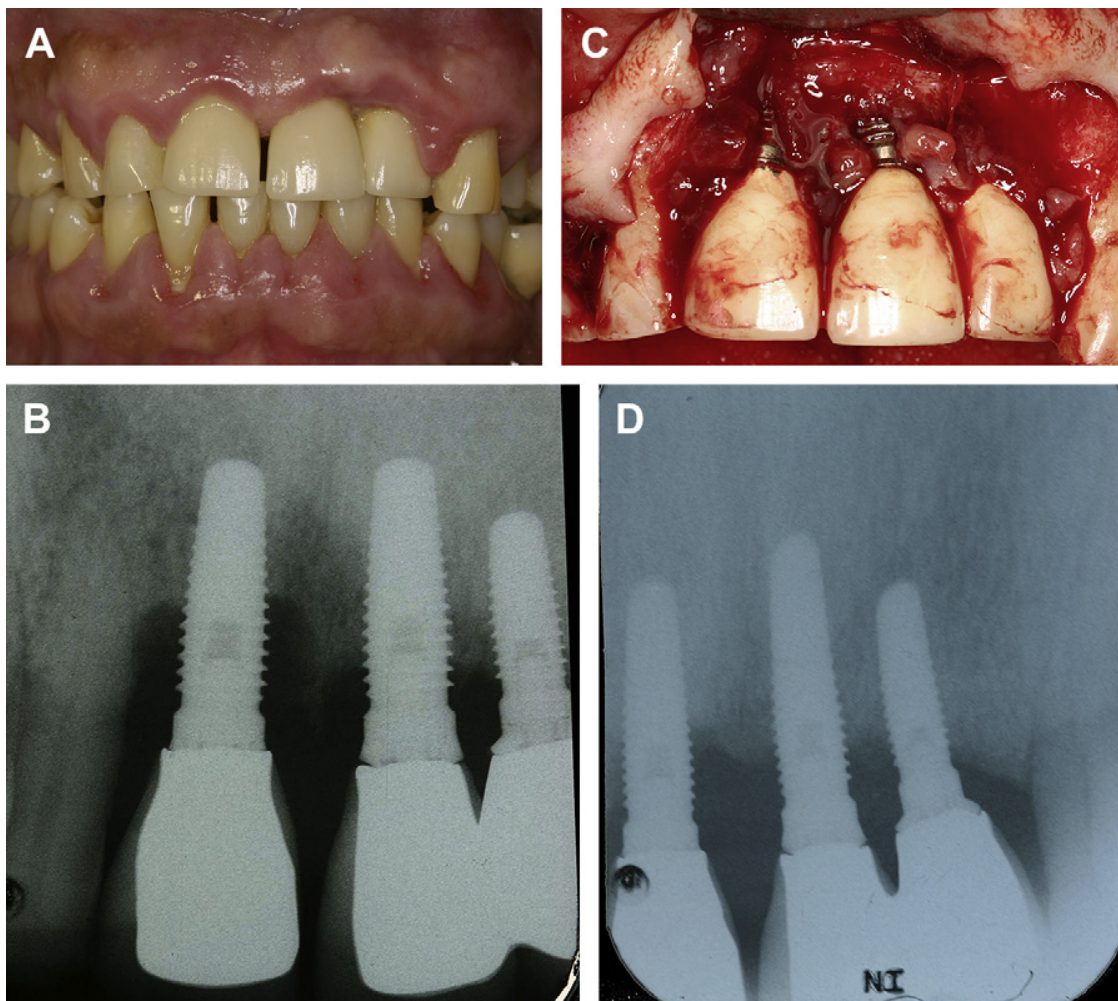


Fig. 2. (A) The patient presented with peri-implantitis at sites #s 9 through 11. (B) Radiograph of site #s 9 through 11 revealed bone loss around the dental implants. (C) Surgical debridement of infected dental implants. Debridement was coupled with decontamination of the implant surfaces with tetracycline. Then a bone graft and a barrier were placed. (D) One year postoperatively, the radiograph reveals some bone has been regenerated around the dental implants.

inflammation (bleeding on probing around implants) and that the adjunctive use of antimicrobial mouth rinses had a positive effect.⁷⁴ It was decided, however, that non-surgical treatment of peri-implantitis was unpredictable. The committee stated that the main reason for performing surgical treatment among patients with peri-implantitis was to attain access to the implant surface for debridement and decontamination to reduce the inflammatory lesion.

PROGNOSTICATION OF PERIODONTALLY COMPROMISED TEETH: A REQUIREMENT FOR TREATMENT PLANNING IMPLANT DENTISTRY

In this era of greater dental implant use, there is a propensity to misjudge the long-term prognosis of a tooth with a compromised periodontium (treated or untreated).⁷⁵⁻⁷⁷ Thus, the practitioner may remove a tooth prematurely, reasoning that its retention can damage a potential implant site, or its inclusion in a prosthesis is too risky. Most studies, however, indicate that periodontally treated but questionable teeth have a better long-term retention rate (5 to 40 years) than expected (**Table 1**).⁷⁸⁻⁸⁴

Several recent review papers have noted that there is no single clinical parameter (eg, probing depth, bone loss, clinical attachment loss, mobility, or furcation invasion) that can dependably predict periodontal disease activity, tooth loss, or conversely, long-term tooth preservation.^{75,77} Therefore, combinations of parameters need to be evaluated in concert with clinical judgment to plan treatment and to predict therapeutic outcomes. Furthermore, there is no accurate way to denote a threshold for tooth removal based on periodontal status that is correct in every circumstance. Accordingly, the judgment to remove a tooth will vary depending on its clinical status, and this endeavor should be supported by the best available literature, clinical experience, and the patient's declared goals. **Table 2** lists factors to consider when contemplating extraction versus retention of questionable teeth.⁷⁵

Retrospective Studies	Number of Patients	Mean Years (Range) in Maintenance Treatment	Number of Teeth Assigned a Questionable Prognosis	Number of Questionable Teeth Retained During Maintenance	Number of Questionable Teeth Extracted During Maintenance
Becker et al ⁷⁸	95	5	120	89 (74%)	31 (26%)
Hirschfeld and Wasserman ⁷⁹	600	22 (15-53)	2,139	1473 (69%)	666 (31%)
McFall ⁸⁰	100	19 (15-29)	215	81 (38%)	134 (62%)
Mcleod et al ⁸¹	114	12.5 (5-29)	907	781 (86%)	126 (14%)
Chace and Low ⁸²	166	40	455	400 (88%)	55 (12%)
Checchi et al ⁸³	92	6.7 (3-12)	578	557 (96%)	21 (4%)
Fardal et al ⁸⁴	100	9.8 (9-11)	346	335 (97%)	11 (3%)

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Table 2		
Factors to consider when contemplating extraction versus retention of questionable teeth		
Factor	Retention	Extraction of Teeth
Patient's wishes		
Caries		
Caries susceptibility	Not prone	Prone
Caries present	Minor	Extensive
Restorability	Easy	Difficult
Monetary issues		
	Retain	
Crown lengthening		
Esthetic zone	Low smile line	High smile line
Randomized control trial (RCT) needed		Probably removal
Periodontal status		
Periodontal attitude	Accepts surgery option	Does not want surgery
Maintenance compliance	Good	Poor
Bone levels		
Bone graft will help save tooth	Retain	
Additional bone loss ruins implant site		Remove
Bone level <10 mm	Caution needed	
Mobility		
Stability	Easy to stabilize	Requires extensive stabilization
Patient comfort	Patient comfortable	Patient uncomfortable
Root-resected teeth		Remove
Systemic issues (eg, valve replacement)		Remove
Furcations	Class 1 or 2 or 3	Class III (if poor oral hygiene)
Endodontic status		
Straight-forward RCT	Retain	
Re-treatment		Remove
Apicoectomy needed		Remove
Apical pathosis		Probably remove
Intact arch		
No prosthetic plan	Retain	
Complex prosthetic plan		Remove
Prosthetics		
Partial needed	Stabilizes questionable teeth	Rests on questionable teeth
Other implants	Provide occlusal stability	
Esthetic zone	Esthetics not a concern	If additional bone loss will make it unesthetic
Patient's attitude	Opposed to implants	
Seeking final solution		Remove questionable teeth
Dental history		
Abscesses	None or once	Multiple times
Surgical therapy	None or once	Multiple times

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PERIODONTAL AND RESTORATIVE CONSIDERATIONS IN THE ESTHETIC ZONE IN PERIODONTAL PATIENTS

Numerous factors need to be considered when deciding whether to save or extract a tooth in the esthetic zone. These include restorability, disease susceptibility (caries and periodontitis), papillary and gingival considerations, tooth esthetics, smile line, the need for endodontic therapy, and the emotional and esthetic concerns of the patient. The decision to extract or maintain teeth must include deliberation with regard to benefits versus risks of retaining compromised teeth. The judgment to remove a tooth may be based on one critical issue or it may rely on collective risks related to a few factors.

SIZE OF PERIODONTAL DEFECTS

Typically, it is advantageous to preserve shallow rather than deep probing depths around teeth or implants.⁸⁵ A common outcome of periodontal surgery is gingival and papillary recession, however, this may result in unattractive black triangles between teeth. Thus, resective therapy that produces an unattractive gingival contour is contraindicated on teeth with a guarded prognosis in the esthetic zone.⁸⁶ In the premaxilla, it is sensible to remove periodontally questionable teeth and replace them with implants if this will aid in preserving the level of the gingiva and bone. Nevertheless, a result of preserving the gingival height where bone loss occurred is the need to accept deeper probing depths around implants when they are inserted, or the obligation to rebuild bone support before implants are placed (site development).

SUMMARY

The periodontal patient who has been treated and is receiving periodontal supportive therapy can be a candidate to receive dental implants if there are no systemic contraindications for therapy. In these individuals, implants can be placed in native bone, grafted bone, or in a sinus that has been augmented with bone. There should not be a rush to judgment with respect to removing periodontally compromised teeth and replacing them with dental implants, because these teeth often have better long-term prognoses than perceived by the dentist. On the other hand, in the esthetic zone, consideration should be given to removing teeth before altering the gingival topography and creating an esthetic dilemma. Ultimately, in the periodontal patient, it is a judgment call by the clinician that determines which teeth to retain and which to replace with dental implants. This decision needs to be based upon available scientific evidence, clinical experience of the clinician, dental history of the patient, and his or her desires.

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